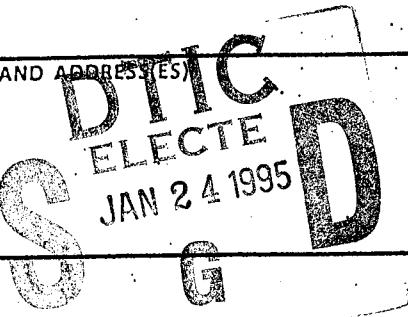


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FOR
BASIN F LIQUIDS
IRA DECISION DOCUMENT

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Prepared for

U.S. ARMY MATERIEL COMMAND
PROGRAM MANAGER
ROCKY MOUNTAIN ARSENAL CLEANUP
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TABLE OF CONTENTS

	<u>Page</u>
OVERVIEW	1
I. INTRODUCTION	2
II. SUMMARY OF SITE HISTORY, CONTAMINATION AND SELECTED REMEDY	4
III.A. DESCRIPTION OF DIFFERENCES	5
III.B. METHODOLOGY FOR MAKING A DECISION TO CHANGE	8
III.C. DESCRIPTION OF THE REMEDY INCLUDING THE BRINE MANAGEMENT OPTION	11
IV. RMA COMMITTEE COMMENTS	12
V. AFFIRMAION OF THE STATUTORY DETERMINATIONS	13
VI. PUBLIC PARTICIPATION ACTIVITIES	14

LIST OF TABLES

TABLE 1 - COMPOSITION OF INCINERATOR PRODUCT BRINE

LIST OF FIGURES

FIGURE 1 - CONCEPTUAL DESIGN OF SUBMERGED QUENCH
INCINERATION WITH SPRAY DRYING

FIGURE 2 - CONCEPTUAL DESIGN OF SUBMERGED QUENCH
INCINERATION

APPENDICES

APPENDIX A - CITIZEN COMMENTS

OVERVIEW

This document is a Preliminary Draft Explanation of Differences (EOD) which explains intended changes in the Basin F Liquids Remediation Proposed by the Program Manager's Office for the Rocky Mountain Arsenal cleanup. This document explains the differences between the remedial action outlined in the May 1990 Final Decision Document for Basin F Liquid Treatment and the currently intended remedial action. The Decision Document describes a two-step on-site remedial action involving direct incineration of the Basin F Liquids followed by onsite spray-drying of the incineration product brine to create a salt for export and landfill. This EOD presents an alternative method involving one on-site step, direct incineration of the Basin F Liquid, followed by one off-site step, export of the product brine for further treatment and disposal at an existing off-site brine treatment plant. This alternate method represents no change in the primary incineration treatment step.

This EOD presents only a summary discussion of the original remedial action decision and the proposed changes to the remedial action. The administrative record, which contains the Final Basin F Liquids Treatment Assessment Report, the Final Decision Document, and other documentation, is available for public review at the Joint Administrative Record and Document Facility located in the Security Building at the West Gate of Rocky Mountain Arsenal.

I. INTRODUCTION

Rocky Mountain Arsenal (RMA) occupies approximately 27 square miles in Adams County, directly northeast of metropolitan Denver, Colorado. RMA was the site of both U.S. Army and private chemical manufacturing activities between 1942 and 1982. A lined evaporation pond called Basin F was constructed in the northern part of the site in 1956, and was operated continuously until 1981. In early 1987, the U.S. Army, Shell Oil Company, and U.S Environmental Protection Agency (EPA) agreed that an accelerated remediation (Interim Response Action or IRA) be undertaken pursuant to the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) to contain the liquid contents of Basin F and contaminated soils and to permanently treat the liquids once they were in storage.

According to the proposed consent decree and the 1989 Federal Facility Agreement governing the Arsenal cleanup, the U.S. Army was designated as the lead agency responsible for the remedial action. All remedial action decisions pertaining to the Basin F Liquids IRA to date have been reviewed by representatives of the U.S. EPA, the Colorado Department of Health, Shell Oil Co., Tri-County Health Department, and several local officials and private citizens.

The Final Treatment Assessment Report (TAR) and Final Decision Document for Basin F Liquids stated that the preferred alternative for treating the Basin F liquids was the Submerged Quench Incinerator. This method would destroy the organic contaminants in the liquid but would not treat the metal constituents in any way. The submerged quench incinerator produces a residual wastewater stream that contains those metals and salts from the Basin F liquid. It was proposed that this wastewater stream, or brine, was to be spray dried on-site to remove the water from the brine and leave behind a solid powder containing the metals and salts. These would then be shipped to an appropriate landfill. The proposed spray drying would reduce the volume of

incinerator residues but would not provide permanent treatment for metals. The TAR document stated that the Army and Shell would continue to examine alternative approaches to residue management other than spray drying, such as offsite brine treatment, that could provide some removal or recovery of metals in the brine.

In the period since the Final Decision Document was issued in May 1990, the Army has been involved in both detailed design of the on-site remedial treatment system and detailed evaluation of the off-site destinations for export of the treatment residues. During the review and planning for off-site salt disposal, the Army gathered additional information on potential waste destinations for the product brine. New information was obtained on the nature of the salt product, the design and costs of a spray-dryer and solids handling equipment, and on the costs and availability of the two approved commercial hazardous waste landfills that are closest to Rocky Mountain Arsenal. New information was also obtained on the availability of approved brine treatment plants, on their performance characteristics, and on the costs of brine treatment. The results indicated that the export of liquid brine to a licensed treatment facility that would remove the toxic metals for either recovery, or stabilization and disposal, represented a more protective and more effective solution than the operation of an on-site salt drying and handling system and landfill disposal of residual salt.

CERCLA Section 117 requires that the lead agency provide an Explanation of Differences (EOD) for public review when new information leads to a modification of a component of a remedial action. The remainder of this document will describe the information and decision methods which led to the intended change from spray drying and land disposal to brine treatment and metals removal or recovery.

II. SUMMARY OF SITE HISTORY, CONTAMINATION AND SELECTED REMEDY

The history of events leading to the decision to remediate the Basin F liquids are detailed in the Final Decision Document.

The remediation of Basin F liquid and sludges and soils was to be addressed in two parts. The first part, now completed, was the removal of the Basin F liquids to secure storage, and removal and stockpiling of the soils and sludges in a double-lined and capped temporary waste pile. The second part concerns Basin F liquid treatment by means of a Submerged Quench Incineration system.

In the Decision Document the conceptual design included a Submerged Quench Incineration and spray dryer treatment that resulted in a dry residual salt. The total treatment system consists of a waste feed system, an incineration system, air pollution control equipment, a spray dryer, and a residuals handling system. Figure 1 is a conceptual schematic of the total treatment system as selected in the Final Decision Document.

III.A. DESCRIPTION OF DIFFERENCES

The major differences between the remedial action described in the May 1990 Decision Document and the currently intended remedial action are in the area of incinerator brine management. The brine is an aqueous solution that contains approximately 25-35% salt, 65-75% water, and low levels of heavy metals (primarily copper). An approximate composition of the incinerator product brine appears in Table 1. The currently intended remedial action will involve offsite shipment, treatment, and disposal of the brine with no additional onsite processing (spray drying) (see Figure 2). The specific differences between the current and the original remedial action are as follows:

- Elimination of the spray dryer from the design and all ancillary equipment associated with the operation of the spray dryer. (Baghouse, salt transfer system, salt storage vessels, and salt loading equipment). The elimination of the spray dryer equipment will also eliminate the need for offsite shipment and landfill disposal of the dried salt product.
- The residual brine will be shipped in bulk form by rail to a licensed treatment, storage, and disposal facility for further treatment, metal removal or recovery, and disposal. Two commercial facilities have committed to accept the brine.
- The intended remedial action may result in a cost increase of approximately \$3-\$5M.
- The proposed remedial action will require rail transport of approximately 14 million gallons, or approximately 700 rail cars, of brine offsite for treatment and recovery or disposal. The May, 1990 remedy required rail

transport and landfilling of approximately 47,100 cubic yards, or 590 rail cars, of dried salt.

- The intended remedy will offer additional treatment of the brine at the Treatment, Storage or Disposal Facility (TSDF). This treatment will include metals removal/recovery which will reduce or eliminate the volume of waste which will ultimately be landfilled and reduce its mobility and potential long term environmental impact.
- It is important to recognize that the May 1990 remedial action and the intended remedial action remain fundamentally the same. The only differences are in the management of the residual brine.

BASIS FOR MODIFYING THE REMEDY

As part of the remedial design activities and treatability studies conducted during the design phase, the lead agency, the U.S. Army, has identified additional information which has warranted the development of this proposed modification to the remedial action. The Army intends to implement the modification to the remedial action because it is more protective of human health and the environment in the long term due to metal removal. It will also ensure a more continuous operation of the Basin F liquid incinerator. That is, the spray dryer and the solids handling equipment may be prone to potential mechanical failures and downtime which would also require the incinerator to be shut down periodically. The modified remedial action reduces the number of onsite processes and activities required. The specific reasons for choosing this remedial action are as follows:

- Treatability studies involving the spray dryer process have indicated that the mean particle size of the dried salt is in the 20 micron size range.

Elimination of the spray dryer process would eliminate potential discharge of these dusts through the baghouse, as well as reduce emissions of gas combustion by-products. Elimination of the spray dryer process would eliminate the potential discharge of fugitive emissions associated with the process.

- The offsite management of the brine as a liquid would eliminate onsite process equipment. Elimination of this process would make the overall implementation and execution of this remedial action less complex and more efficient.
- The modification to the remedial action is more protective of the environment in that it would reduce the amount of material subjected to ultimate landfilling by greater than 99% if the metals are removed from the brine and landfilled, or completely eliminate land disposal if the metals are ultimately recovered.

III.B. METHODOLOGY FOR MAKING A DECISION TO CHANGE

Following issuance of the Final Decision Document in May 1990, the Army obtained new information on residuals management options. This section describes how this information was analyzed, and what decision was recommended as a result of that analysis.

Two specific cases for each basic alternative were considered:

- On-site Spray drying, with disposal of solids at the BFI landfill at Last Chance, Colorado
- On-site Spray drying, with disposal of solids at the USPCI landfill at Grassy Mountain, Utah
- Off-site Brine treatment, with removal and disposal of metals
- Off-site Brine treatment, with removal and commercial recycling of metals,

The method for comparing these alternatives was similar to that used in the original comparison of treatment alternatives in the Basin F Liquids IRA Treatment Assessment Report. In a semi-quantitative scoring and ranking procedure, the four specific alternatives were evaluated with respect to seventeen specific factors that conform generally to the seven remedy selection criteria in CERCLA guidance for feasibility studies.

The seventeen factors are:

- Community protection (short term emissions)
- Worker protection (associated with residuals management)
- Reduction of toxic metals
- Reduction of waste volume

- Proven experience of the residuals management method
- Ease of operation and management
- Monitoring requirements, on-site
- Regulatory process, on-site (complexity of ARARs)
- Offsite waste management (regulatory process requirements)
- Offsite waste management (transportation and logistics)
- Commercial availability of the residuals management facility
- Timeliness (relative to the Basin F Liquids IRA schedule)
- Cost (differential capital and operating costs)
- On-site discharges (protectiveness, relative to emissions)
- Offsite transportation hazards
- Long-term effectiveness (wastes left on site)
- ARARs (ability to meet ARARs as presently defined)

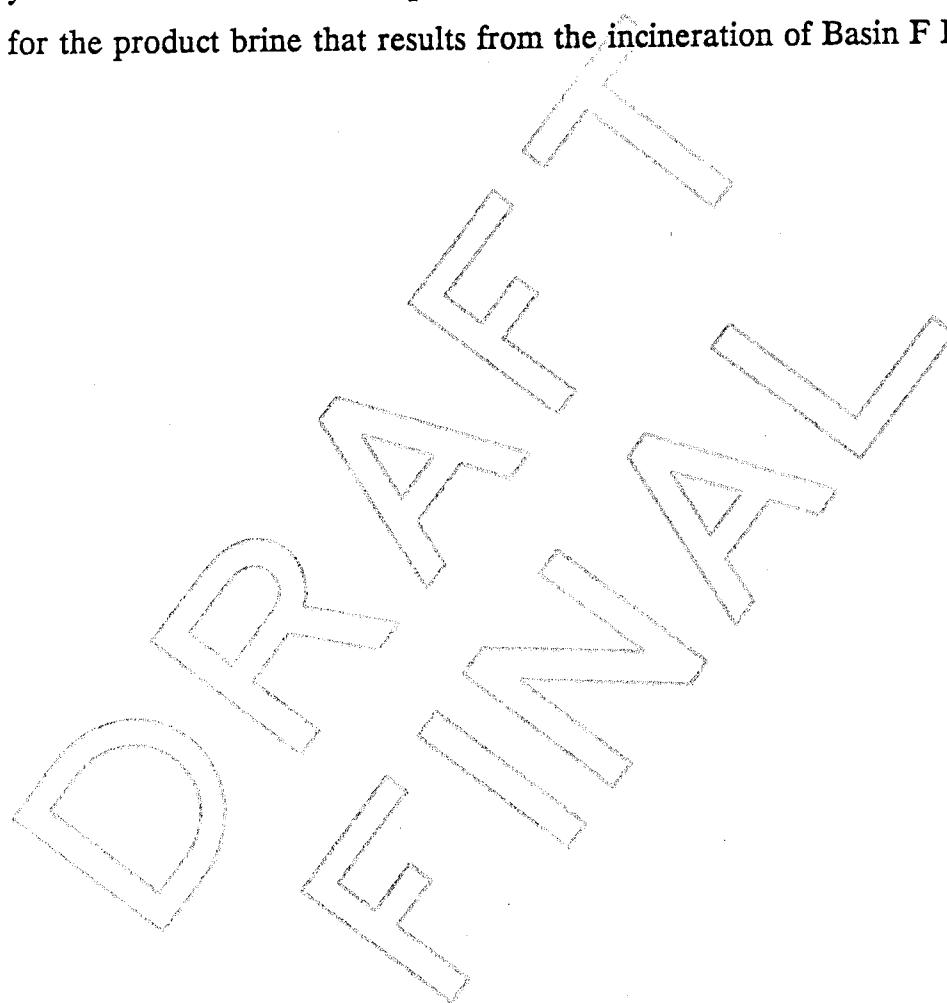
These criteria were measured for each of the four alternatives in terms of scales defining a range of conditions from the best to the worst case for each of the seventeen factors. The scores (set by a panel including the Organizations and State) for each alternative were then multiplied by weights assigned to each factor. A team of engineers and health scientists established these weights. The sum of the weighted scores was the total score for each alternative; the alternatives were arranged in the order of their scores. This is called the Base Case Ranking:

1. Brine management with metals recycling
2. Brine management with metals removal and landfilling
3. Spray drying and disposal in Colorado
4. Spray drying and disposal in Utah

A number of sensitivity tests were performed on this ranking, to model different points of view; this was done by varying the weights and noting the change (if any) in the rank

order. These tests showed that under a broad spectrum of different points of view (different sets of weights), the rank order was unchanged.

Based on the ranking and the sensitivity analysis, the assessment team recommended that the Army select brine treatment at a permitted commercial facility as the management method for the product brine that results from the incineration of Basin F Liquids.



III.C. DESCRIPTION OF THE REMEDY INCLUDING THE BRINE MANAGEMENT OPTION

Most of the elements of the preferred remedial action for Basin F Liquid have not changed in this intended modification. The system will consist of a waste feed system, incineration system and air pollution control equipment. The components that will be changed are the spray dryer and solids handling system. The residual brine will be pumped from the SQI to one of two holding tanks. The brine will then be pumped from the holding tanks to railcars for shipment to an offsite treatment plant. The railroad siding area will increase above what was planned for the spray drying system in order to accommodate enough railcars for offsite brine disposal.

Offsite disposal of the brine will be at a treatment or recovery facility approved for such treatment operation. At one type of facility, the brine would go through a precipitation step to remove the metals. The remaining brine would be discharged to an existing permitted surface water outfall. The metals would be potentially recovered or stabilized and buried in an approved landfill. At the other type of facility, the brine treatment would precipitate the metals and recover them. The remaining brine would be biologically treated and discharged to an existing permitted surface water outfall.

IV. RMA COMMITTEE COMMENTS

A preliminary draft of this Explanation of Differences (EOD) document was provided to the Basin F Liquid IRA Subcommittee at the November 1, 1990 Subcommittee Meeting at Rocky Mountain Arsenal. Committee members and their technical consultants who received the preliminary draft document and a briefing on the Army's intention included:

U.S. Environmental Protection Agency
Colorado Department of Health
Fluor-Daniel Inc. (Independent Technical Oversight Contractor)
U.S. Army
Shell Development Co.

Comments have been received from all of the above-named organizations and this EOD has been modified to address those comments.

V. AFFIRMATION OF THE STATUTORY DETERMINATIONS

The intended change in residuals management strategy for the Basin F Liquids IRA from spray drying and its associated landfill disposal of a solid, to brine treatment and its associated removal of metals, continues to satisfy the requirements of the Federal Facility Agreement for Rocky Mountain Arsenal (FFA) and applicable portions of the Comprehensive Environmental Response, Compensation and Liability Act as amended and reauthorized (CERCLA/SARA). The basic treatment selected for Basin F liquids in the Decision Document (submerged quench incineration) is unchanged, as are essential aspects of the residuals management strategy (i.e., no on-site disposal of residuals).

The new information obtained on residuals management options shows that the brine management option described herein:

- Remains protective of human health
- Complies with ARARs
- Is cost-effective
- Utilizes permanent solutions and alternative treatments (or resource recovery) technologies.

VI. PUBLIC PARTICIPATION ACTIVITIES

This Explanation of Differences (EOD) Document will be available for public inspection in the Joint Administrative Record and Document Facility (JARDF), located in the Security Building at the West Gate of Rocky Mountain Arsenal. The JARDF is open to the public M,W,F: 12:00 to 4:30 p.m.; T,Th: 5:00 to 9:00 p.m.; and Sat: 10:00 a.m. to 4:00 p.m. The phone number is (303) 289-0143. The JARDF also contains copies of the Basin F liquids Treatment Assessment Report and Decision Document.

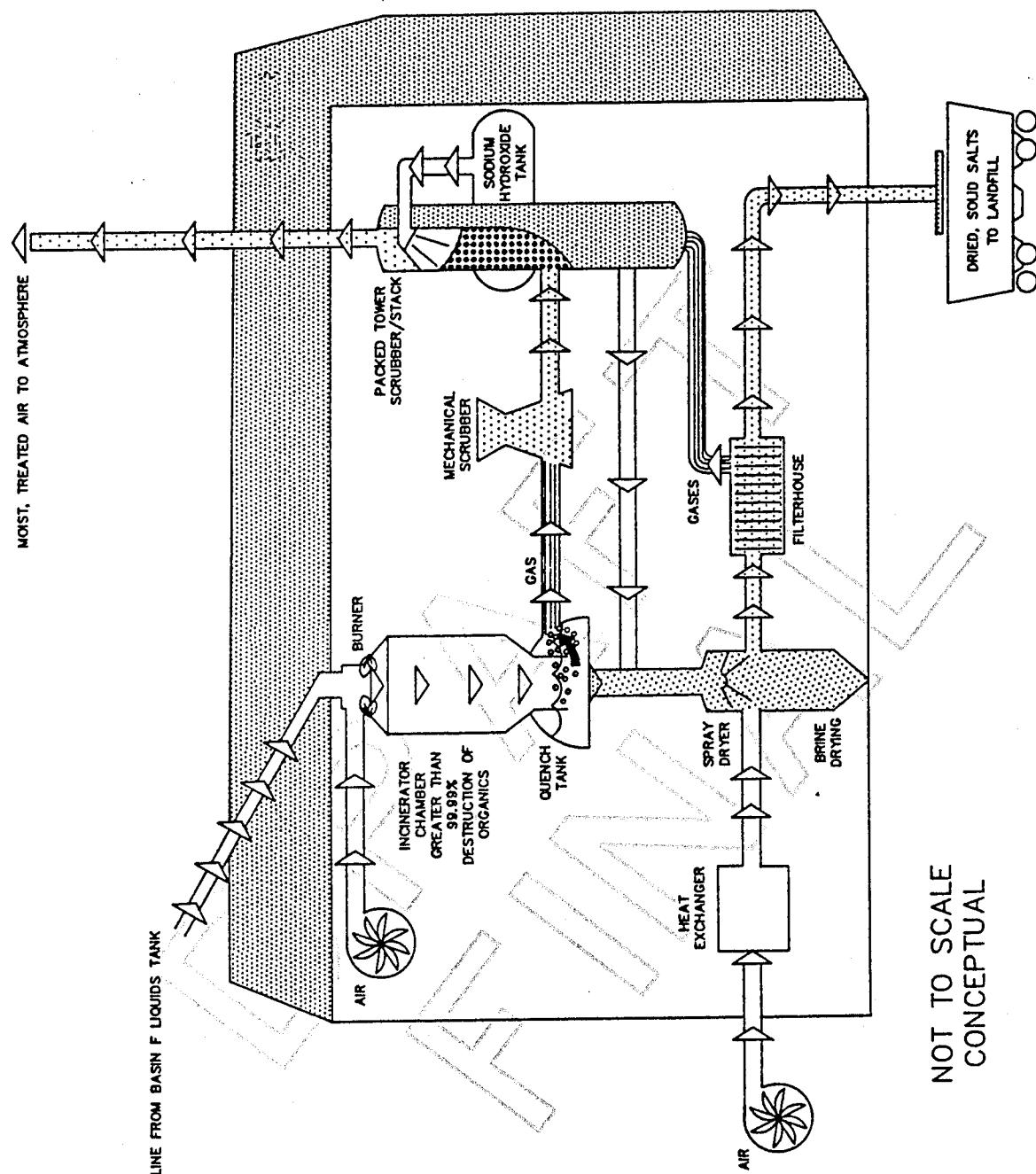
Issuance of this EOD does not require a public meeting according to EPA guidelines; however, the Army is holding at least one townhall meeting/workshop to provide a forum to hear public concerns and input. The Army will provide public notice of the contents of this EOD in two forms. All local citizens identified from prior Basin F public meeting mailing lists and meeting attendee sign-up sheets will receive a copy of a fact sheet which summarizes the EOD. All members of the RMA Committee and the Technical Review Committee will receive a copy of the fact sheet and a copy of the EOD itself.

The Army will accept written comments on the EOD from the public through December 10, 1990. Written comments will be considered and attached to the final version of the document as Appendix A.

TABLE 1
COMPOSITION OF INCINERATOR PRODUCT BRINE

	ppm	%
Water		67%
Volatile Organic Compounds	Not Detected	
Semi-Volatile Organic Compounds	Not Detected	
PCB/Pesticides	Not Detected	
Dioxins and Furans		
Furan ¹	.0000000076	.000000000076 %
Dioxin ¹	.0000000068	.000000000068 %
Anions		
Cl	94,000	9.4%
SO ₄	34,800	3.5%
F	17.7	.0018%
PO ₄	14,433	1.4%
NO ₃	145	.015%
Total Dissolved Solids	227269	22.7%
Total Suspended Solids	457.1	.046%
Metals		
Barium	0.35	.000035%
Calcium	80	.008%
Chromium	4.2	.0004%
Copper	1580	.16%
Iron	92	.0092%
Lead	5.9	.0006%
Magnesium	56	.0056%
Nickel	12.7	.0013%
Potassium	23,800	2.4%
Selenium	1.9	.0002%
Sodium	60300	6.0%
Mercury	0.022	.000002%
Vanadium	0.05	.000005%

¹ These values are marginally above the detection limit for the most sensitive analytical method available. This reported value does not indicate with certainty that this compound is present.



SUBMERGED QUENCH INCINERATION
WITH SPRAY DRYING

NOT TO SCALE
CONCEPTUAL

Job No. :	22206A
Prepared by :	E.S.P.
Date :	10/31/90

CONCEPTUAL DESIGN OF SUBMERGED
QUENCH INCINERATION WITH
SPRAY DRYING

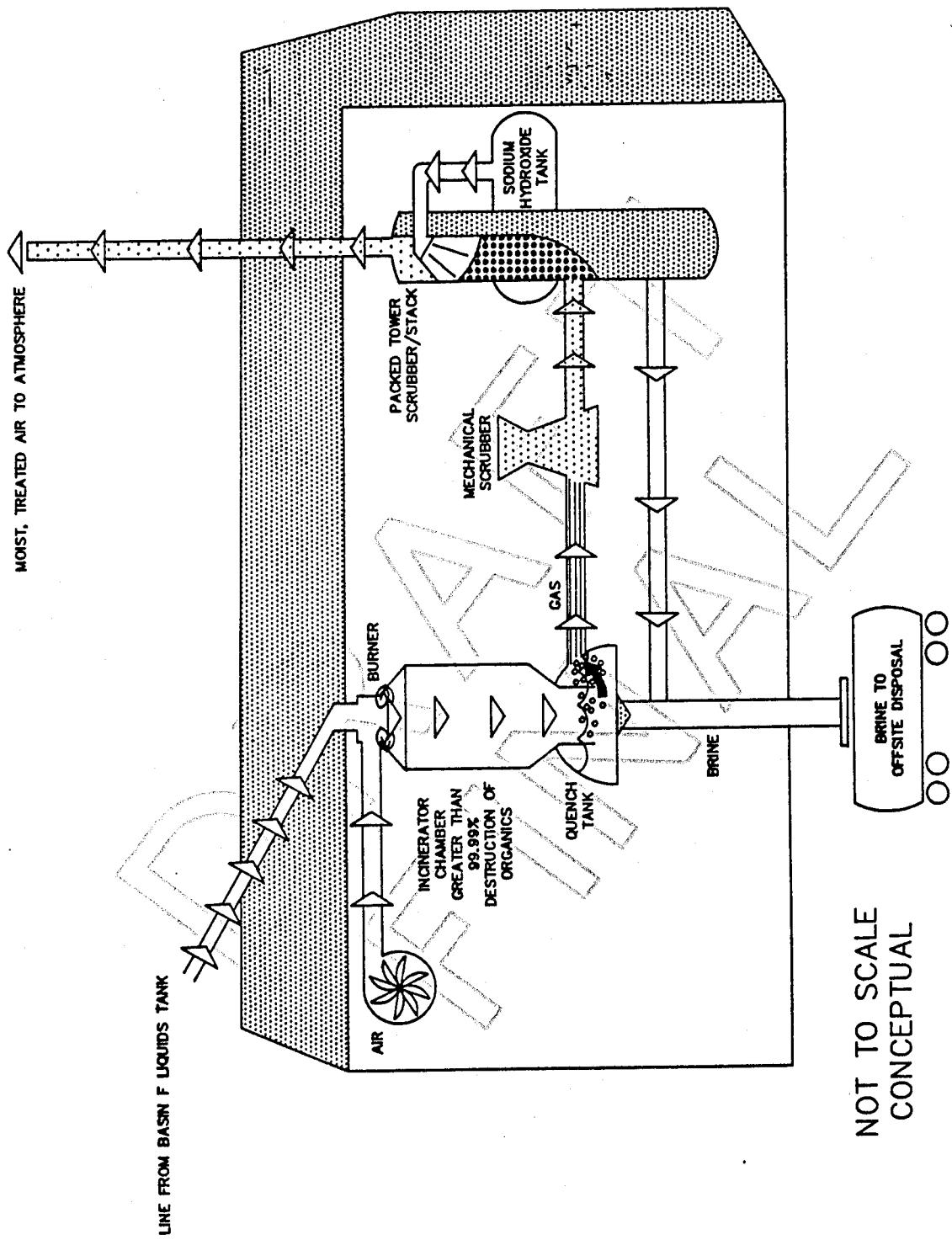


FIG6B

Job No. :	22206A
Prepared by :	E.S.P.
Date :	10/31/90

CONCEPTUAL DESIGN OF
SUBMERGED QUENCH
INCINERATION

SUBMERGED QUENCH INCINERATION

FIG. 2

APPENDIX A
CITIZEN COMMENTS
